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CONVERGENCE OF FINANCIAL DEVELOPMENT IN ASEAN BASED ON PRIVATE CREDIT AND LIQUID LIABILITIES INDICATORS

Alvin Sugeng Prasetyo[1], Mochamad Devis Susandika[2]
Faculty of Economics and Business, University of Trunojoyo Madura, Madura,
Sub Division of Macro Economic Analysis, the Government of East Java Province

Abstract The financial development gap for ASEAN countries is critical to analyze since the widening financial development gap will lead to underdeveloped financial sector performance. The concept considered appropriate to measure the gap of financial development is the sigma, and beta convergence approaches. Therefore, this study aims to measure, test, and analyze the convergence of sigma and beta financial development in ASEAN. The method used was the Generalized Moment Method (GMM) dynamic panel with 2010-2017. Results of the study showed that there is a convergence of sigma and beta financial development in ASEAN countries. The limitation of this study is that it only uses two indicators of financial development. The governments of each ASEAN country can improve the financial sector by reforming the financial sector to mitigate, improve, and encourage the development of the financial sector.

Keywords: ASEAN, convergence, financial development gap, GMM

Abstract *Kesenjangan pembangunan keuangan untuk negara-negara ASEAN sangat penting untuk dianalisis karena kesenjangan pembangunan keuangan yang semakin lebar akan menyebabkan kinerja sektor keuangan yang kurang berkembang. Konsep yang dianggap tepat untuk mengukur kesenjangan pembangunan keuangan adalah pendekatan konvergensi sigma, dan beta. Oleh karena itu, penelitian ini bertujuan untuk mengukur, menguji, dan menganalisis konvergensi perkembangan keuangan sigma dan beta di ASEAN. Metode yang digunakan adalah panel dinamis Generalized Moment Method (GMM) dengan periode 2010-2017. Hasil penelitian menunjukkan bahwa terdapat konvergensi perkembangan keuangan sigma dan beta di negara-negara ASEAN. Keterbatasan penelitian ini adalah hanya menggunakan dua indikator perkembangan keuangan. Pemerintah masing-masing negara ASEAN dapat meningkatkan sektor keuangan dengan melakukan reformasi sektor keuangan untuk memitigasi, meningkatkan, dan mendorong perkembangan sektor keuangan.*

Keywords: *ASEAN, GMM, kesenjangan perkembangan keuangan, konvergensi*

University of Trunojoyo Madura
Jl. Raya Telang, Perumahan Telang Indah, Bangkalan
E-mail: alvin.prasetyo@trunojoyo.ac.id

Introduction

Financial liberalization is essential for a country. This is intended so that the financial sector increases and reduces the gap in the financial sector between developed and developing countries to achieve the standards achieved by developed countries (Apergis et al., 2012). Another goal of economic liberalization is to provide funds for capital investment and reduce the gap in financial development between developing and developed countries. The gap in financial development between developing countries and developed countries is getting smaller. There has been an increase in financial development, and access to financial services has increased over time (Bahadir & Valev, 2015).

The concept of convergence can analyze the gap of financial development. Convergence analysis covers income disparities between countries and can also be developed to measure disparities in financial development between countries (Bruno et al., 2012). The concept of convergence began with the Solow economic growth model in 1956 and 1957. Solow said that there would be a convergence of per capita income between one country and another if the distribution of non-competitive consumption technology existed throughout the country (Andreano et al., 2013). This means that the level of prosperity experienced by developed and developing countries will one day meet, and the economy will improve. The term catching up effect is when developing countries catch up with developed countries (Kant, 2019).

The convergence of financial development can be measured by two approaches, namely sigma convergence and beta convergence (Kılınç et al., 2017). Sigma convergence can be measured by dispersion through coefficients of variation. Sigma convergence explains that the smaller the coefficient of variation, the lower the gap of financial development over time. The higher the coefficient of variation, the wider the gap of financial development over time. Beta convergence illustrates the faster increase in developing countries financial development compared to developed countries. This condition is indicated by the negative value of the beta coefficient, which negatively influences an increase in financial development in a certain period (lag period) to an increase in financial development in the initial period (current period). Beta convergence in financial development can be measured by unconditional convergence and conditional convergence (Fung, 2009). Unconditional convergence is also called absolute convergence. Unconditional convergence is a condition of convergence that assumes that economies between countries have similarities, such as economic structure, demographic conditions, saving rates, and other economic variables (Sare et al., 2019). Conversely, conditional convergence assumes that structural characteristics between countries have inequality so that the structural characteristics of the state influence convergence. This has consequences in the conditional convergence model that needs to be added with various explanatory variables.

One region that wants to catch up with the financial sector with developed countries in ASEAN. ASEAN was formed in 1967 to improve economic performance, unity and stability in its member countries such as Indonesia, Malaysia, the Philippines, Singapore and Thailand. In the following years since its establishment, Brunei Darussalam, Cambodia, Myanmar, Laos, and Vietnam signed allegiance to ASEAN and saw its benefits. ASEAN can create development finance that conforms to developed country standards, such as having good access and is easily accessible to the public and an integrated financial system, but has many obstacles. This reason is the basis of this study. This study will reveal that ASEAN financial development is convergent or divergent. If it converges, ASEAN's financial development will go to steady-state conditions.

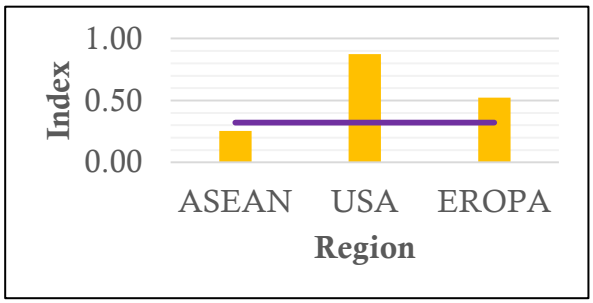

Figure 1. Financial Development Index in ASEAN, US, and Europe 2010-2017
Source: IMF (2017)

Figure 1 shows that the ASEAN financial development index is 0.25. The index is below the USA, Europe, and the World, so it can be said that the financial sector in ASEAN is still lagging. This means that there are still many people in ASEAN countries who have not enjoyed financial services. The contributing factor is the lack of financial literacy for the ASEAN community, so many do not understand the purpose and benefits of the presence of the financial sector. In addition, unclear financial regulations can hamper the acceleration of the financial sector. This condition will increase the issue of ASEAN financial deepening.

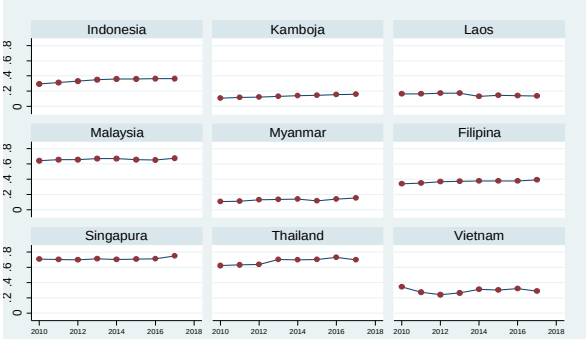

Figure 2. Financial Development Index ASEAN 2010-2017
Source: IMF (2017)

Figure 2 shows that there are differences in financial developments in ASEAN countries. Malaysia, Singapore and Thailand have high financial development index figures compared to other ASEAN member countries. The financial development index of the three countries is above 0.6 points with an increasing trend. The index numbers mean that the development of the financial sector in the three countries is good and supported by an efficient and strong financial system. Indonesia, the Philippines and Vietnam can be classified as medium financial development index figures. Indonesia, the Philippines and Vietnam's financial development index figures are 0.2-0.4 points. The index figure means that the development of the financial sector in the three countries is not yet optimal. Financial development can be optimized by financial deepening. If financial deepening occurs in a country, it can be seen from the increasing amount of financing from banks. The greater the bank financing, the higher the financial deepening so that financial development can be optimized.

Several researchers have carried out the study of the convergence of financial development. Dekle & Pundit (2018) researched the convergence of financial development in ASIA countries. The estimated results show that during the 2004-2011 period, the financial system in Southeast Asian countries could reach the economies of developed countries (Hong Kong, China; Japan; Republic of Korea; and Singapore). Apergis et al. (2012) also researched the convergence of financial development in the convergence club, 50 countries. Estimation results show that all countries do not converge in financial developments. The study of the convergence of financial development was carried out by Kılınç et al. (2017). The research objective is to study and analyze the convergence of financial development in European Union countries. The method used is the Generalized Moment Method (GMM) with the period 1963-2012. Convergence results in personal credit, liquid liabilities, stock market capitalization, and stock changes in the European Union.

Asongu (2014) conducted a study to assess the dynamic convergence of African financial developments in money, credit, efficiency and size. Empirical evidence is based on 11 homogeneous panels by region (Sub-Saharan and North Africa), income levels (low, middle, upper-middle and upper-middle), legal origins (English and French civil law). Law) and religious dominance (Christianity and Islam). Asongu (2012) examines convergence in the intermediary dynamics of financial depth, efficiency, activity and size. The findings show

that countries with a small financial intermediary depth, efficiency, activity and size are countries with an intermediary financial depth, efficiency, activity and size, respectively. We also provide the speed of convergence and the time needed to achieve full convergence (100%).

Antzoulatos et al. (2011) researched the convergence of financial development. Antzoulatos et al. (2011) used 13 financial development indices from the World Bank's Financial Development and Structure database to test the convergence of financial systems in a large number of industrialized and developing countries. Our results show no convergence for the financial system as a whole or their main segments. Far from decreasing, the differences in the financial systems of the sample countries seem to persist or even increase over time. This difference is clearer for banks' stock and private credit market segments and less for the bond and bank market segments. Also, the concurrent club for most of the indexes exceeds industry versus developing country differences and differences in the bank-based financial system versus the capital market.

Inflation, financial openness, and economic growth are used as variables that influence the convergence of conditional financial development. The study of the interrelationship between inflation and financial development has become an essential issue for monetary authorities recently, given the current emphasis on inflation targeting as the primary monetary policy framework (Abbey, 2012). A high inflation rate will worsen the financial markets and disrupt the efficiency of the financial system. This will hamper the growth of financial development. Therefore, inflation harms financial development.

Financial openness refers to removing government ceilings on interest rates and other controls on financial intermediaries (Marc, 2018). Financial openness enhances growth in an economy by allowing domestic and international firms to access their financial markets and improve the efficiency and corporate governance in the domestic financial system. Through financial openness, it is expected that real interest rate increases will stimulate savings as consumers forgo current consumption favouring future consumption (Arestis et al., 2002). This condition will increase financial development. Economic growth, however, refers to the increase in the number of goods and services produced by an economy over time. Economic growth could be attributed to increases in population, accumulation of capital, and increased productivity. An increase in productivity is a significant factor responsible for per capita economic growth. An increase in the per capita income of citizens (investors) could make investors invest in long term financial assets in many ways through the financial system mechanism, which leads to financial development (Wang, 2019).

Differences in research results in previous studies form the basis for the continued topic of financial development convergence. The gap between this study and previous studies lies in the independent variable in conditional convergence. All previous studies did not include variables that represent financial liberalization, but this study uses. Furthermore, this study is more specific to ASEAN countries but does not include Brunei Darussalam because there are no indicators of financial liberalization. Also, this study will calculate the speed of ASEAN countries' financial development in pursuing the development of developed countries. The equation in this study uses the same method, namely the GMM dynamic panel. This study aims to test and analyze the convergence of sigma and beta in ASEAN financial development based on the background. It will measure the pace to catch up with financial development with developed countries. This study consists of four points, namely introduction, methodology, results and discussion, and closing.

Method

This study uses secondary data types from 2010-2017. The secondary data type is data obtained from an institution, both domestic and international institutions. The data has been provided on the institution's website, so researchers do not need to do survey data. The research sample is ASEAN (Indonesia,

Cambodia, the Philippines, Malaysia, Singapore, Thailand, Myanmar, Laos and Vietnam), while Brunei Darussalam is not included because the required data is not available. Econometrics data in this study are classified into panel data types because it is a combination of cross-section and time-series data. The 2010-2017 period was used because, in that period, the countries mentioned had joined. During that period, the financial development index was still below the World and developed countries such as the United States and the European Union. Data sources used in this study were obtained from the World Bank and IMF websites. The method used is GMM.

The first step in estimating is to measure the convergence of sigma with dispersion to find the coefficient of variation. The dysperesi formula for finding the coefficient of variation is mathematically written as follows (Kant, 2019):

$$CV_{1,2} = \frac{\sqrt{\frac{\sum(Y - \bar{Y})^2}{n}}}{\bar{Y}} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Information:
CV : Coefficient Variation
Y : Indicators of financial development of ASEAN member countries
Y bar : ASEAN financial development indicator average
n : the number of ASEAN countries used

The next step is to regress the time trend (t) with the coefficient of variation. This is to strengthen the results of the coefficient of variation. Sigma convergence occurs when the coefficient value is negative on the trend variable, indicating convergence, while the positive coefficient value indicates no convergence (Andreano et al., 2013). Mathematically it can be written as follows:

$CV1_t = \alpha + \beta T_t + e_t$ .....(2)

$CV2_t = \alpha + \beta T_t + e_t$ .....(3)

Where CV1 and CV2 are the coefficients of variation in the financial development of the first indicator and the coefficient of variation in the financial development of the second indicator, T is the time trend, if one is 2010 if two is 2011, and so on until the end of the research period. The parameter α is called a constant, while β is the slope. The variable e is the error term. Subscript t is to show the data used in time series data.

The next step is to analyze absolute convergence. Here is the absolute convergence equation (DeJuan et al., 2012):

$FD1_{it-1} = \alpha + \beta FD1_{it-1} + e_t$ .....(4)

$FD2_{it-1} = \alpha + \beta FD2_{it-1} + e_t$ .....(5)

FD1 and FD2 are the first and second financial development indicator variables of the current period. While $FD1_{it-1}$ and $FD2_{it-1}$ are the first financial development indicator variables and the previous two periods (lag period), absolute convergence occurs when the β slope has a negative sign. Conversely, if it has a positive sign, it means there is no convergence.

The next step is to identify conditional convergence with the GMM dynamic panel method. Here is a conditional convergence model in this study:

$$FD1_{it} = \alpha + \beta_1 FD1_{it-1} + \beta_2 INF_{it} + \beta_3 FOI_{it} + \beta_4 EG_{it} + \varepsilon_{it} \ldots\ldots\ldots\ldots\ldots\ldots (6)$$

$$FD2_{it} = \alpha + \beta_1 FD2_{it-1} + \beta_2 INF_{it} + \beta_3 FOI_{it} + \beta_4 EG_{it} + \varepsilon_{it} \ldots\ldots\ldots\ldots\ldots\ldots (7)$$

FD1 and FD2 are the first financial development indicators using private sector banks (% GDP), and the second financial development indicators use liquid liabilities (% GDP). INF, FOI, and EG are independent variables, including inflation (per cent), financial openness index (point), and economic growth (per cent). Inflation is used based on the calculation of the CPI with the base year 2010. The financial disclosure index is obtained directly through http://web.pdx.edu/ with The Chinn-Ito Index approach. Economic growth is calculated based on real GDP by sector with the base year 2010.

Detection of GMM dynamic panels is valid or not to be analyzed and needs to do Sargan test. The null hypothesis for this test states that there is no problem with instrument validity (valid instruments). Suppose there is a probability value of a Sargan test below the significance level of 1%, 5% or 10%. In that case, the model is invalid, or the null hypothesis (Ho) is rejected. If the probability value is above the significance level of 1%, 5% or 10%, then it is said that the model is valid or the null hypothesis (Ho) is accepted. Next, an autocorrelation test using Arellano-Bond statistics. If the probability value is below the significance level of 1%, 5% or 10%, then H0 is rejected, indicating autocorrelation in the model so that it is invalid.

Heteroscedasticity also needs to be done based on the value of the Hansen test. If the probability value is above the significance level of 1%, 5% or 10%, then H0 is rejected, which indicates the absence of heterogeneity in the model so that it is valid. Conversely, if the probability value is above the significance level of 1%, 5% or 10%, then H0 is rejected, which indicates the absence of autocorrelation in the model so that it is valid.

Results and Discussions

Estimation results and discussions become important points in a study. This is because it is related to the compatibility between empirical test results and the theory used. Besides the estimation results that have been processed according to previous studies, previous studies have supported the intention. If it is not in accordance with the theory, it needs to be discussed in more detail. Here are the results of the dynamic panel estimation:

Table 1. Convergence of Sigma Financial Development ASEAN

Year	CV1	CV2
2010	0,724	0,6142
2011	0,723	0,6120
2012	0,719	0,6100
2013	0,718	0,6098
2014	0,715	0,6090
2015	0,71	0,6087
2016	0,708	0,6084
2017	0,704	0,6081

The first discussion is related to the convergence of sigma. Sigma convergence functions to measure the level of dispersion of financial development. If the dispersion of financial development has decreased, it can be said that the gap in financial development between countries tends to decrease. Estimating sigma convergence for financial development in ASEAN during the period 2010-2017 shows sigma convergence. This can be seen from the trend value of the decreasing coefficient of variation during 2010-2017, as presented in Table 1. These results mean that the gap in financial development between ASEAN countries is getting smaller. Sigma convergence also indicates that reducing the level of inequality cannot be done quickly. However, it requires a process of improvement in the overall financial sector in each ASEAN member country to improve the financial system and reduce the level of inequality. The financial system can be improved by reforming the financial sector to mitigate and improve and encourage the financial sector's development.

Increasing the resilience and competitiveness of the financial sector

Asked to improve the welfare of the ASEAN community through strengthening the financial sector that contributes to economic security, sustainable economic growth, and economic development that is inclusive and equitable. The gap in financial development between ASEAN countries is getting smaller, showing the ASEAN financial markets are still relatively easy amid increasing pressure. This is inseparable from the efforts of risk mitigation and financial market deepening measures taken by each country. The need for banking services is growing rapidly in ASEAN countries due to international or national developments, and a strong legal basis is needed for banking activities in ASEAN countries. This legal basis is one of the efforts that must be prepared immediately with banking laws to encourage this global development.

In conducting their business activities, banks in ASEAN countries must use the precautionary principle and good bank governance. Furthermore, it is necessary to

carry out effective guidance and supervision for banking institutions. This is performed to improve the quality of banking in each country.

Table 2. Convergence of Sigma Financial Development ASEAN

Variable	Model 1	Model 2
Constanta	0,728***	0,6135***
	(0,000876)	(0,0007)
t	-0,0029***	-0,0008***
	(0,00017)	(0,00014)
R-Square	0,9792	0,8338

*, **, *** significant at the 10%, 5%, and 1% levels.

The estimation results in Table 2 are used to strengthen the dispersion results in Table 1. The estimation results in model 1 and model 2 show that there is a sigma convergence. This can be seen in the time trend coefficient variable, which is negative. The time trend variable of both models has a significant effect on the variable coefficient of variation. Time trends are significant because they have a probability value of less than 1% level. R-square model 1 is 0.9792, and model 2 is 0.8338. This means that both models are appropriate. The coefficient on the trend variable is lower than 0, so the average variable coefficient of variation has a declining trend. The coefficient of t in model 1 is -0.0029, meaning that during the period 2010-2017, the average reduction in the coefficient of variation is around 0.0029 per cent per year. The coefficient of t in model 2 is -0,0008, meaning that during the 2010-2017 period, the average reduction in the coefficient of variation is around 0,0008 per cent per year.

The diminishing financial development gap will be smaller with establishing the ASEAN Banking Integration Framework (ABIF) agreement. ABIF is an initiative in the banking sector under the framework of the ASEAN Economic Community (AEC). ABIF was created to accelerate ASEAN banking liberalization through an ASEAN banking integration framework because ABIF will reduce barriers to market access and reduce barriers to bank operational coverage. ABIF is carried out bilaterally among ASEAN members by negotiating the "Qualified ASEAN Bank" (QAB), which will be accepted and sent by an ASEAN member country. The cooperation is part of an effort to continue encouraging the development of the financial services sector in ASEAN to grow healthy, sustainable. It can contribute to improving the ASEAN economy so that the welfare of the ASEAN people increases.

Table 3 is the estimation results for detecting absolute beta convergence. The coefficients $FD1_{it-1}$ and $FD2_{it-2}$ have negative signs. Negative signs also indicate signs that are as expected or consistent with the theory. This means that there is an absolute convergence of financial development between ASEAN countries in 2010-2017. The results of this estimation give the meaning that the financial development of Indonesia, Malaysia, Thailand, the Philippines, Myanmar, Laos, and Cambodia, and Vietnam are growing faster than Singapore, so that the result is the financial development of Indonesia, Malaysia, Thailand, the Philippines, Myanmar, Laos, and Cambodia and Vietnam will be the same as Singapore. The situation occurred because the capital-labour ratio in the financial sector in Indonesia, Malaysia, Thailand, the Philippines, Myanmar, Laos, and Cambodia, and Vietnam was smaller than in Singapore. The AR (1) and AR (2) probabilities, the Sargan test, and the Hansen test of both models are more than 1%, 5%, and 10% significance levels, so that they are free from autocorrelation, heteroscedasticity, and dynamic GMM panel models that are valid.

Table 3. Unconditional Convergence of Financial Development in ASEAN

Variable	Model 1	Model 2
$FD1_{it-1}$	-0,0587***	
	(0,0258)	
$FD2_{it-1}$		-0,0813***
		(0,0115)
AR(1)	0,966	0,269
AR(2)	0,948	0,432
Sargan Test	0,637	0,395
Hansen Test	0,530	0,757

*, **, *** significant at the 10%, 5%, and 1% levels.

The convergence speed needs to be measured because it can be known what percentage of speed catches up. The absolute convergence speed in model 1 is 0,76 per cent per year.

This figure can be obtained by applying the following formula:

$$\lambda = -\frac{\ln(\beta + 1)}{T} \times 100\%$$
$$\lambda = -\frac{\ln(-0{,}0587 + 1)}{8} \times 100\%$$
$$\lambda = 0{,}76\ \%$$

The absolute convergence speed in model 2 is 1,06 per cent per year. This figure can be obtained by:

$$\lambda = -\frac{\ln(\beta + 1)}{T} \times 100\%$$
$$\lambda = -\frac{\ln(-0{,}0813 + 1)}{8} \times 100\%$$
$$\lambda = 1{,}06\ \%$$

The absolute convergence speed is known, then the half-life calculation in ASEAN is as follows:

Model 1

$$The\ hal\ life = -\frac{\ln(2)}{\ln(\beta + 1)} = -\frac{0{,}69315}{-0.06049} = 11{,}5$$

Model 2

$$The\ hal\ life = -\frac{\ln(2)}{\ln(1 + \beta)} = -\frac{0{,}69315}{-0{,}08450} = 8{,}2$$

Based on these calculations, the half-life in ASEAN in model 1 (financial development indicators with private credit by banks) is 11,5. This means that the time needed for ASEAN countries to close half of the initial gap is 11 years five months. The half-life in ASEAN in model 2 (an indicator of financial development with liquid liabilities) is 8,2. This means that the time needed for ASEAN countries to close half of the initial gap is eight years two months. The convergence of financial development with liquid liabilities indicators is faster than private credit by bank indicators. The time difference between the two indicators is three years, three months. This condition is only an estimation, but to achieve the convergence of financial development in ASEAN countries, it takes a lot of time because it depends on the complexity of the problem as a source of increased financial development in each country.

Table 4. Conditional Convergence of Financial Development in ASEAN

Variable	Model 1	Model 2
$FD1_{it-1}$	-0,062***	-
	(0,005)	
$FD2_{it-1}$	-	-0,096***
		(0,038)
INF_{it-1}	-0,708*	-0,475***
	(0,429)	(0,174)
FOI_{it-1}	0,106*	-0,042
	(0,062)	(0,060)
EG_{it-1}	0,946**	0,529
	(0,428)	(0,219)**
AR(1)	0,159	0,245
AR(2)	0,376	0,612
Sargan Test	0,306	0,143
Hansen Test	0,997	0,615

*, **, *** significant at the 10%, 5%, and 1% levels.

The convergence speed needs to be measured because it can be known what percentage of speed catches up. The conditional convergence speed in model 1 is 0,8 per cent per year. This figure can be obtained by applying the following formula:

$$\lambda = -\frac{\ln(\beta + 1)}{T} \times 100\%$$
$$\lambda = -\frac{\ln(-0{,}062 + 1)}{8} \times 100\%$$
$$\lambda = 0{,}8\%$$

The conditional convergence speed in model 2 is 1,26 per cent per year. This figure can be obtained by applying the following formula:

$$\lambda = -\frac{\ln(\beta + 1)}{T} \times 100\%$$
$$\lambda = -\frac{\ln(-0{,}096 + 1)}{8} \times 100\%$$
$$\lambda = 1{,}26\ \%$$

The conditional convergence speed is known, then the half-life calculation in ASEAN is as follows:

Model 1

$$The\ hal\ life = -\frac{\ln(2)}{\ln(\beta + 1)} = -\frac{0{,}69315}{-0.06400} = 10{,}8$$

Model 2

$$The\ hal\ life = -\frac{\ln(2)}{\ln(1 + \beta)} = -\frac{0{,}69315}{-0{,}10092} = 6{,}9$$

Based on these calculations, the half-life in ASEAN in model 1 (financial development indicators with private credit by banks) is 10,8. This means that the time needed for ASEAN countries to close half of the initial gap is ten years eight months. The half-life in ASEAN in model 2 (an indicator of financial development with liquid liabilities) is 6,9. This means that the time needed for ASEAN countries to close half of the initial gap is six years nine months. The convergence of financial development with liquid liabilities indicators is faster than private credit by bank indicators. The time difference between the two indicators is three years nine months. This condition is only an estimation, but to achieve the convergence of financial development in ASEAN countries, it takes a lot of time because it depends on the complexity of the problem as a source of increased financial development in each country.

Table 4 for models 1 and 2 shows the convergence of conditional financial developments. This determines that the coefficients FD1it-1 and FD2it-1 are negative and significant at the 1 per cent level. Model 1 shows the variables and financial openness and economic growth have a significant effect on financial development. Model 2 shows the effects of economic growth and variables significantly affecting financial development, while financial openness does not significantly influence financial development. Models 1 and 2 show that the probabilities of AR (1) and AR (2), the Sargan test, and the Hansen test of both models are more than 1%, 5%, and the significance level is 10%, so they are free from autocorrelation, heteroscedasticity, and valid dynamic GMM panel models.

The estimation results of sigma convergence and conditional convergence are supported by Asongu (2014) research. Asongu (2014) conducted a study to assess the dynamic convergence of African financial developments in money, credit, efficiency, and size. Empirical evidence is based on 11 homogeneous panels by region (Sub-Saharan and North Africa), income levels (low, middle, upper-middle, and upper-middle), legal origins (English and French civil law) and religious dominance (Christianity and Islam). Asongu (2012) examines convergence in the intermediary dynamics of financial depth, efficiency, activity, and size. The findings show that countries with a small financial intermediary depth, efficiency, activity, and size are countries with an intermediary financial depth, efficiency, activity, and size, respectively. We also provide the speed of convergence and the time needed to achieve full convergence (100%). Antzoulatos et al. (2011) researched the convergence of financial development. Antzoulatos et al. (2011) used 13 financial development indices from the World Bank's Financial Development and Structure database to test the convergence of financial systems in a large number of industrialized and developing countries. Our results show no convergence for the financial system as a whole or their main segments. Far from decreasing, the differences in the financial systems of the sample countries seem to persist or even increase over time. This difference is clearer for banks' stock and private credit market segments and less for the bond and bank market segments. Also, the convergent club for most of the indexed industries exceeds developing countries' differences and differences in the bank-based financial system versus the capital market.

Inflation has a significant effect on financial development, meaning that inflation plays a role in the financial sector's performance. A negative sign on the coefficient of inflation means an increase in inflation is higher, which will worsen the financial sector's performance. Inflation is generally considered a general price increase in the macroeconomy. High inflation in ASEAN countries will negatively impact low-income individuals and corporate profits. Higher inflation will reduce the real income of the ASEAN people and company profits so that the ASEAN community and private companies that have loans at banks will risk default. This will increase NPL and slow down financial development. This condition can be said that banks experience disintermediation between surplus units and deficit units. The results of this study are supported by Hami (2017) research; namely, inflation significantly affects financial development in Iran. The findings of this study suggest that the effects of inflation on financial development indicators in Iran were

negligible, which can be due to changes in operating costs of financial intermediaries, adoption of inflation targeting in macro levels, or minor changes in household savings due to increased prices of goods and services. Therefore, in the author's opinion, inflation control by controlling the money supply, adopting proper monetary policies by the Central Bank of Iran, and making some reforms on the structure of the taxing system of Iran can decrease the negative effects of inflation on financial development in Iran. Khan (2015) researched the effect of inflation on financial development. Khan (2015) studies the purpose of the impact of inflation on financial development in Pakistan for 1991-2011. To do so, Regression and Correlation methods have been applied. Experimental findings expose that high trends of inflation delay the performance of financial markets. There is a negative relationship between inflation and financial development.

Financial openness has a significant effect on the first financial development indicator. This gives the meaning of financial openness obtained in financial development in ASEAN. Financial openness is achieved by removing barriers to cross-border capital flows and financial services, expanding and deepening cross-border financial ties, and eliminating unfavourable treatment for foreign investors and foreign capital. Financial openness through reducing capital controls and deregulation of financial markets can support economic growth and improve welfare by creating opportunities for better and more efficient allocation of resources and through portfolio and risk diversification under appropriate controls, frameworks, and regulatory tools. Financial openness, along with institutional and educational variables, explains most of the variation in financial development across countries and over time. Cakan (2017) researches financial openness to financial development. Cakan (2017) study aims to examine whether the intensity of financial openness drives financial development in Turkey between 1974-2014. Three financial development indicators are used to build data from World Development Indicators. Autoregressive Distributed Lag Model (ARDL) and boundary tests are used to show the long-term relationship between variables. Empirical results show that financial openness has predictive power in driving financial development. These results have very important conclusions about the Turkish Custom Union agreement with the European Union. Ersoy (2011) also researched financial development. Ersoy (2011) investigated the impact of financial openness on Turkey's financial development, growth, and output volatility. The boundary test results reveal that financial openness in a long-term equilibrium relationship with financial development, growth, and output volatility. The Granger causality test reveals unidirectional causality from financial development to financial openness in the long run and from financial openness to short-term output volatility. However, no granger causality was detected either from financial openness to growth and from financial openness to financial development. The results call for further financial development and a more rigorous monetary and fiscal policy design for financial openness in Turkey.

Economic growth has a significant positive impact on financial development in ASEAN. This gives the meaning that the higher the economic growth of ASEAN countries will improve the quality of financial development in ASEAN. Economic growth plays a role in driving the financial sector's performance. Therefore, each ASEAN country can maintain the stability of economic growth. Economic growth, however, refers to the increase in the number of goods and services produced by an economy over time. Economic growth could be attributed to increases in population, accumulation of capital, and increased productivity. An increase in productivity is a major factor responsible for per capita economic growth. An increase in the per capita income of citizens (investors) could make investors invest in long term financial assets in many ways through the financial system mechanism, which leads to financial development. This relationship between financial development and economic growth has been extensively studied in recent decades. The thrust of this debate has been whether financial sector development causes economic growth (supply-leading phenomenon) or whether it is the growth of the real sector which causes financial sector

development (demand-following phenomenon). Okeke & Acha (2017) researched economic growth and financial development. Okeke & Acha (2017) conducted a study aimed at examining the impact of economic growth on financial development in Nigeria within the period of 1987-2014 using stock market capitalization ratios, growth rates of credit to the private sector, money demand over GDP and All Share Index growth rate as financial development indicators. These financial indicators were used as dependent variables, while Gross Domestic Products were used as independent variables. The study employed an ex-post facto research design. Four hypotheses were tested using data collected from the Central Bank of Nigeria statistical bulletin and annual report. The Ordinary least Square method of analysis was used to test the four hypotheses. The analysis revealed that economic growth has a significant impact on the stock market capitalization, the growth of private credit, money supply, and the All-Share Index in Nigeria. The study, therefore, concluded that economic growth has a significant impact on financial development in Nigeria, and it is recommended that favourable policy should be made to enhance the growth of the economy, which will in turn further develop the financial sector.

Conclusion

The estimation results of sigma convergence and beta convergence show that there is financial development convergence in ASEAN. The decreasing coefficient of variation indicates this during 2010-2017 and a negative sign on the beta coefficient, both absolutely and conditionally. The decreasing coefficient of variation and the negative sign on the time trend coefficient indicates that the gap in financial development between ASEAN countries is getting smaller. The speed of convergence in both models with liquid liability indicators is faster than that of private credit by banks. Model 1 shows the variables and financial openness and economic growth have a significant effect on financial development. Model 2 shows the effects of economic growth and variables significantly affecting financial development, while financial openness does not significantly influence financial development.

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